

STAR Stakeholder Workshop: Education and Training in Radioecology

STUK, Helsinki, Finland 19-20 May 2011

Implementing of Education and Training: Nuclear Knowledge & Data Dissemination with Nucleonica

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Germany



Implementing of Education and Training: Nuclear Knowledge & Data Dissemination with Nucleonica

What is Nucleonica?

The Nucleonica Portal

Nucleonica & Nuclear Knowledge Management

Education & Training

Networking

Case Study: Fukushima



What is Nucleonica?



What is Nucleonica?

- As a result of recent developments on issues such as energy security and sustainability, nuclear safety, security, and non-proliferation, and protection of the environment, we are witnessing a resurgence of interest in nuclear power and the nuclear sciences in general.
- In order to support this renewed interest in the nuclear sciences, we will need a nuclear skills renaissance and it is within this context that the Nucleonica nuclear science web portal (www.nucleonica.com) has been developed.
- With its roots in the traditional paper-based Karlsruhe Nuclide Chart, Nucleonica has grown to become the leading online resource in the nuclear sciences.



Who is Nucleonica aimed at?

- Nucleonica is aimed at scientists, engineers and technical personnel working in the fields of nuclear power, health physics, radiation protection, nuclear and radiochemistry, decommissioning, nuclear medicine, etc. Nucleonica is particularly suitable for education and training of young scientists, engineers and technicians in the nuclear domain.
- It can also be used by professionals for everyday calculations, obtaining quick results in various fields of applications and testing, validating and verifying complex computer models.
- Nucleonica also provides a range of consultancy services and industry cooperations. Examples of some recent studies include an analysis of the handling problems arising in the dismantling of radioactive sources, a decommissioning study of neutron sources, shielding analysis for a minor actinide laboratory, and a comparison of the radiotoxicities of wastes from fission, fusion, and coal fired power stations.



Our Customers & Partners include...



How can Nucleonica help you?

- Nucleonica provides you with user friendly access to the latest reference data from internationally evaluated nuclear data.
- A unique feature is the wide range of web-based nuclear science applications for decay calculations, dosimetry & shielding, etc.
- A variety of networking tools are provided for scientific collaboration.
- In addition Nucleonica offers a range of introductory and advanced training courses in various areas of nuclear science. One of the main aims of these courses is to contribute to establishing a safety culture among the scientists and especially the younger scientists. This safety culture is a necessary prerequisite for a general acceptance of nuclear energy worldwide.



Nucleonica is already being used by thousands of scientists and students worldwide in over 92 countries. Due to its advanced IT features, user friendly and intuitive environment, the platform has recently been endorsed by the Sustainable Nuclear Energy Technology Platform (www.snetp.eu):




“Nucleonica plays ... an important role in making nuclear education more attractive and in building nuclear knowledge for a new generation of engineers and scientists”

The Nucleonica Portal...

The Nucleonica Portal...

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 ... web driven nuclear science

Sunday, May 15, 2011

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[Nucleonica \[blog\]](#)

[Nucleonica \[wiki\]](#)

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[Karlsruhe Nuclide Chart](#)

[Educational Resources](#)

[Training Courses](#)

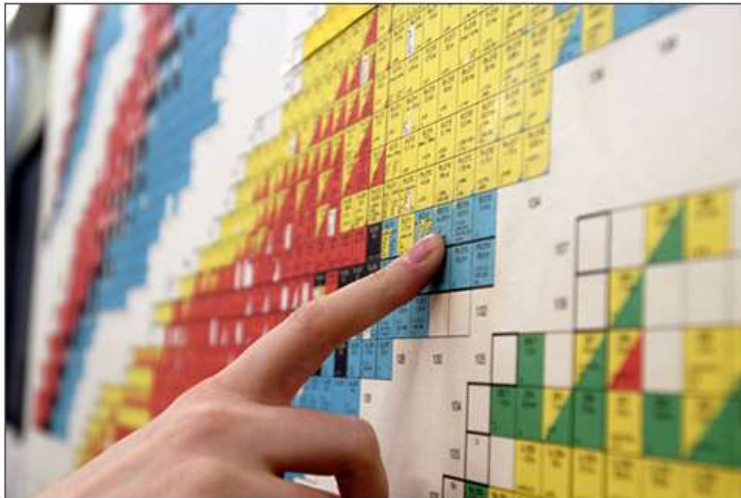
[Ask an Expert](#)

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NUCLEONICA HOT TOPICS

» [Position on Gamma Spectrometry at ITU Karlsruhe](#)

April 17, 2011

Position to develop an Web Spectrum Analyser (WESPA) for nuclear security.....

What is Nucleonica?

- » Nucleonica is an innovative professional and technical resource for knowledge creation and competence building for the worldwide nuclear science community. The portal has grown to become the leading online resource in the nuclear sciences and is particularly suitable for education and training of young scientists, engineers and technicians in the nuclear domain. Our applications enable researchers and specialists to make complex and precise calculations in state-of-the-art fashion.
- » Nucleonica is aimed at scientists, engineers and technical personnel working in the fields of nuclear power, health physics, radiation protection, nuclear and radiochemistry, decommissioning, nuclear medicine, etc. It can be used by professionals for everyday calculations, obtaining quick results and testing, validating and verifying complex computer models.
- » Nucleonica provides you with user-friendly access to the latest reference data

NUCLEAR NEWS

Japan nuke plant in trouble before tsunami

MAY 15 TOKYO, May 15 (UPI) -- Readings taken immediately after the March earthquake in Japan suggest it was the shaking rather than the tsunami that crippled a nuclear power plant. [...]

Thousands of homes sacrificed to save New Orleans from Mississippi floods

MAY 15 Opening of floodgate should also spare Louisiana's capital but leaves farms, oil refinery and wildlife refuge in path of deluge US army engineers have opened a key floodgate to allow the swollen Missi [...]

UPDATE1: Trouble delayed cold shutdown of Hamaoka nuke reactor

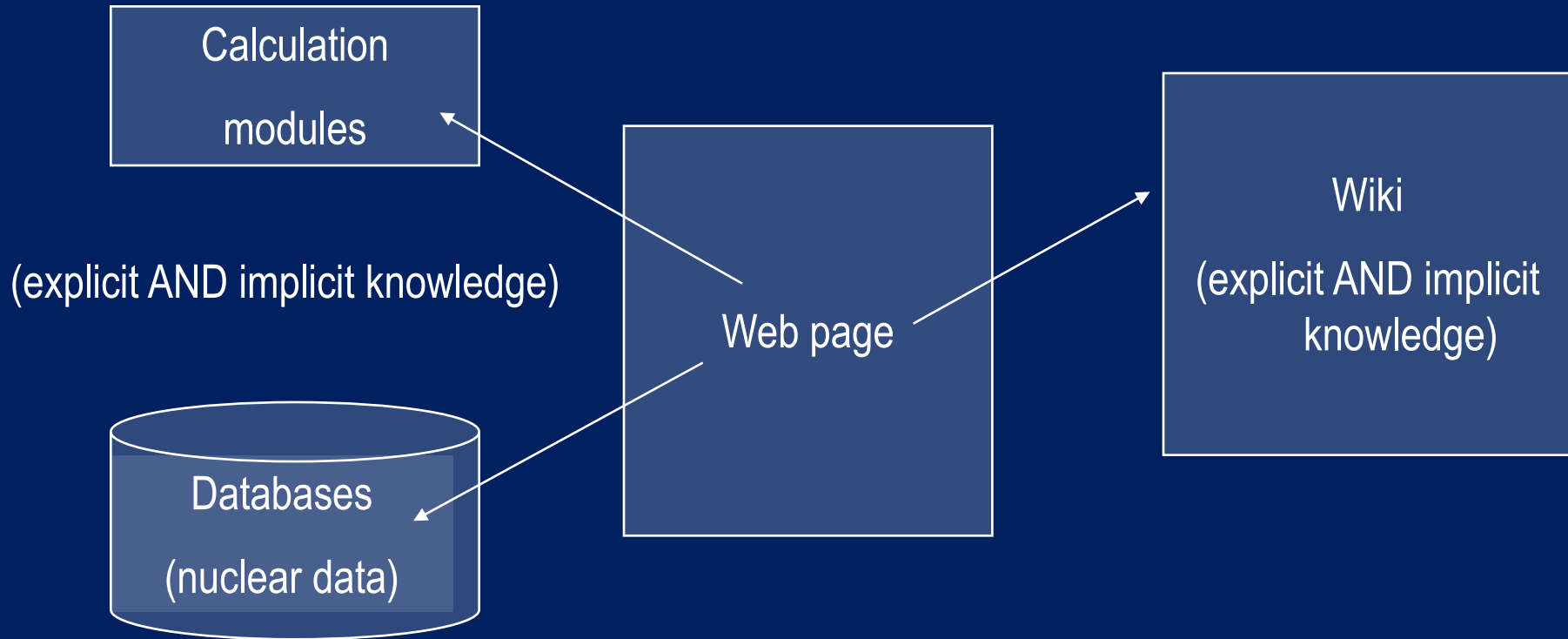
MAY 15 SHIZUOKA, Japan - Chubu Electric Power Co. said Sunday that cooling system trouble delayed the 'cold shutdown' of the ... [...]

UPDATE1: Meltdown occurred at Fukushima No. 1 reactor 16 hrs after March 11 quake

MAY 15 TOKYO - A nuclear fuel meltdown at the No. 1 reactor

The NUCLEONICA Portal:

Nucleonica Architecture & Logical Structure...



The NUCLEONICA Structure

- Application Centre

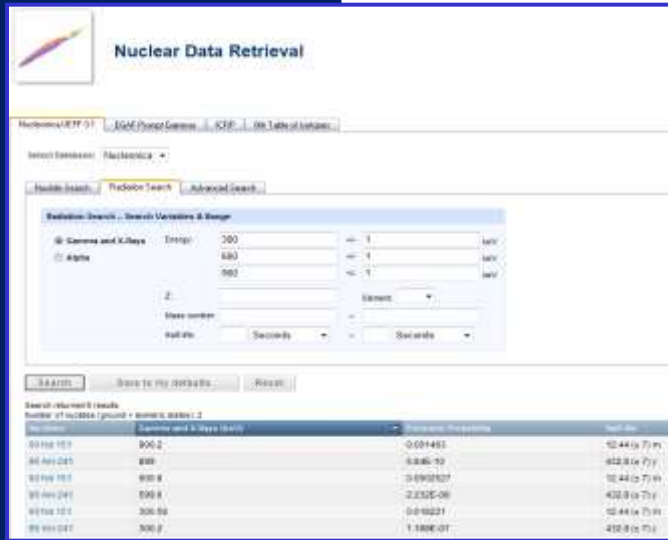
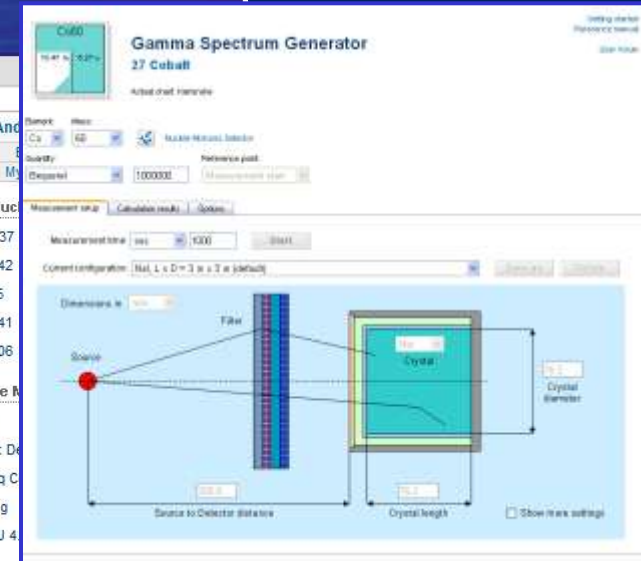
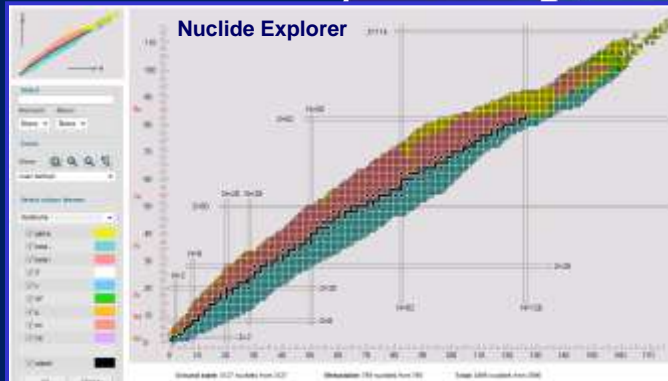


- Community/Networking Centre



The NUCLEONICA Portal:

Nucleonica's unique feature: Web-based Nuclear Science Applications



The Nucleonica Nuclear Science Glossary...



navigation

- Help
- Glossary
- Element Information
- ReadingRoom
- Gallery of Nuclear Science
- Weblinks
- Karlsruhe Nuclide Chart

support

- Nucleonica at a glance
- Nucleonica Overview
- Ask an Expert
- FAQs
- Technical Support

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search

Go Search

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Category:Glossary

This Glossary is based mainly on the following sources:


1. J. Magill and J. Galy, [Radioactivity Radionuclides Radiation](#)  Springer Verlag, 2005
2. J. Magill, G. Pfennig, J. Galy, [Karlsruhe Nuclide Chart](#), 7th Edition, 2006.
3. Additional information can be found in the IAEA [Safety Glossary](#), Terminology Used in Nuclear Safety and Radiation Protection 2007 Edition
4. See also the CTBTO glossary <http://www.ctbto.org/glossary/> 

Articles in category "Glossary"

There are 178 articles in this category.

A <ul style="list-style-type: none">A1, A2ADRAMADAbsorbed DoseActinide(s)ActivityAcute ExposureAlpha decayAlpha particleAnnual Limit of Intake (ALI)AntimatterAtomAtomic WeightAtomic massAtomic numberAuger effect	E cont. <ul style="list-style-type: none">Exemption Levels	O <ul style="list-style-type: none">Orphan source
B <ul style="list-style-type: none">BNCT (Boron Neutron Capture Therapy)Barkas EffectBarnBecquerel (Bq)Beta decayBeta particleBinding energy	F <ul style="list-style-type: none">FermionFindFissileFissionFundamental forces G <ul style="list-style-type: none">Gamma radiationGeological repositoryGlioblastomaGram atomGray, (Gy) H <ul style="list-style-type: none">HASS DirectiveHadronHadron TherapyHalf-lifeHalo nuclidesHigh activity sealed sourceHormesis I	P <ul style="list-style-type: none">Pair productionParityParticle TherapyPhotonPhysical protectionPolonium 210PositronPrimordial radionuclidesProton Q <ul style="list-style-type: none">Quality factor R <ul style="list-style-type: none">RCMRDDRDEREDRadRadiation HormesisRadiation TherapyRadiation protectionRadiation weighting factor, w_R

CBRN Glossry wiki : 23 languages



category

discussion

edit

history

delete

protect

watch

Category:R&N

Category Radiological and Nuclear R&N

Pages in category "R&N"

The following 80 pages are in this category, out of 80 total.

A <ul style="list-style-type: none">Absorbed doseActivityAlpha decayAlpha particleAnnual limit of intake (ALI)AtomAtomic energy	E cont. <ul style="list-style-type: none">Exemption Levels	P cont. <ul style="list-style-type: none">Prefixes (units)
B <ul style="list-style-type: none">Background radiationBecquerel (Bq)Beta decayBeta particle	F <ul style="list-style-type: none">FindFissile material	R <ul style="list-style-type: none">RDDRadiationRadiation HormesisRadioactive contaminationRadioactive decayRadioactive materialRadioactive sourceRadioactivityRadioisotopeRadiological dispersion device (RDD)Radiological limitsRadionuclideRadiotoxicityRegulatory authority
C <ul style="list-style-type: none">Committed effective doseContaminationConversion factorsCurie (Ci)	G <ul style="list-style-type: none">Gamma radiationGray (Gy)	S <ul style="list-style-type: none">ShieldingSievert (Sv)Special nuclear material (SNM)
D <ul style="list-style-type: none">D-valueDecayDecommission	H <ul style="list-style-type: none">Half-lifeHigh risk radioactive sources	T
	I <ul style="list-style-type: none">INESIllicit traffickingImprovised nuclear deviceIonising radiationIsotope	
	K <ul style="list-style-type: none">Karlsruher Nuklidkarte	
	L	

glossary navigation

- Main Page
- Chemical
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- Help
- Recent changes
- Language

search

Go

Search

toolbox

- What links here
- Related changes
- Upload file
- Special pages
- Printable version
- Permanent link

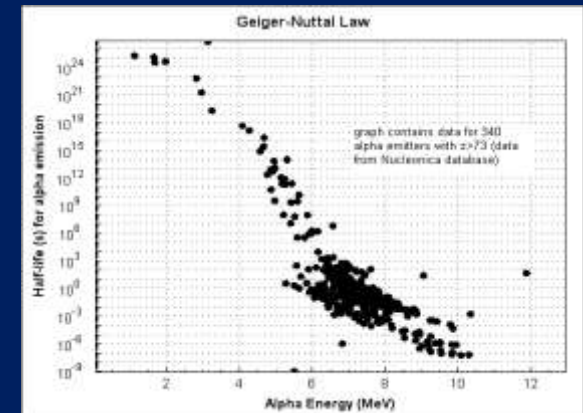
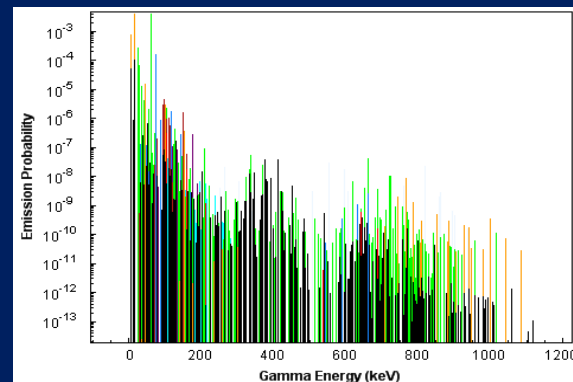
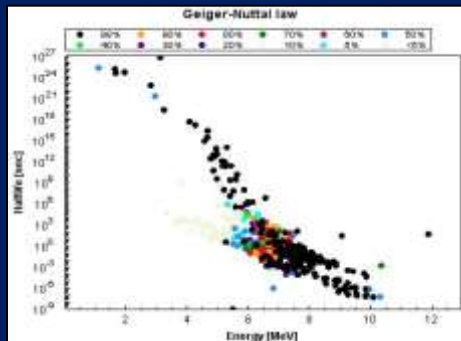
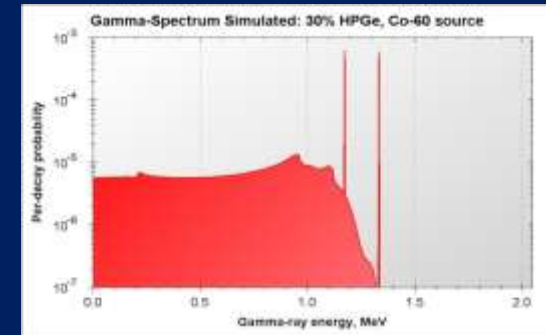
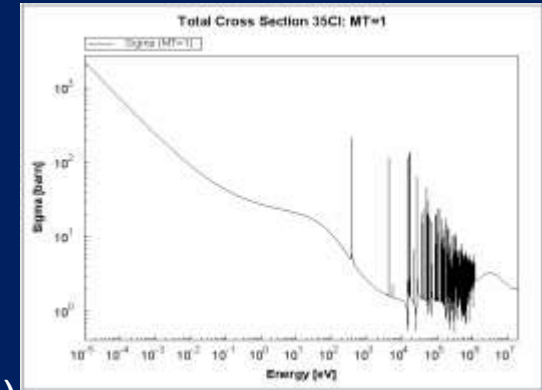
developer's corner

- Frequently Asked Questions(FAQs)

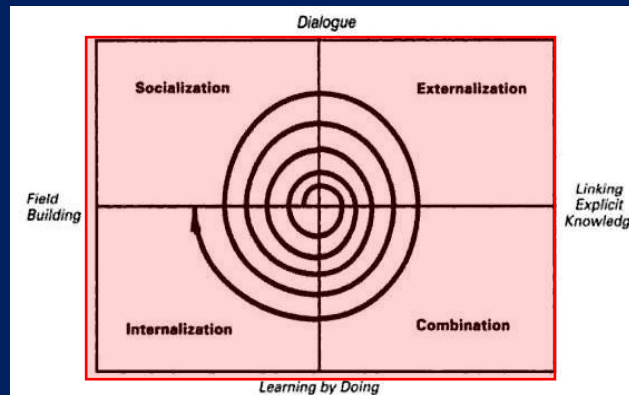
webGraphics...

The Nucleonica webGraphics Features:

- No need to buy expensive commercial software
- Easy to use
- Delivers publication quality scientific graphs
- Variety of formats available (gif, jpg, emf, eps, png, svg)
- Graphics configuration can be stored for future use
- Available at any time from any location
- Under constant further development



NUCLEONICA and KNOWLEDGE MANAGEMENT





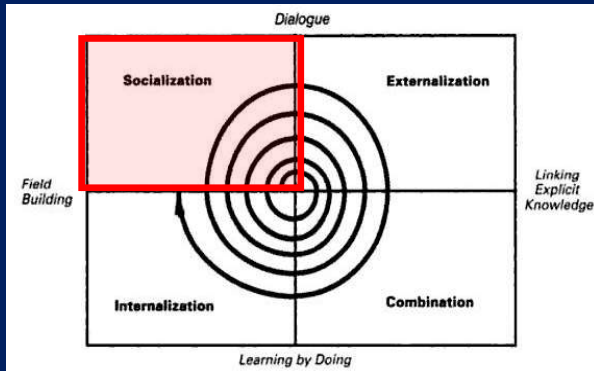
NUCLEONICA and KNOWLEDGE MANAGEMENT

“Know-how” transfer within organisations. One of the main issues here is how to retain tacit knowledge within an organisation. Nonaka and Takeuchi proposed a model for knowledge creation and transfer: knowledge is created through a continuous and dynamic interaction between tacit and explicit knowledge. They conceptualized this model as a “knowledge spiral” in which there are four modes of knowledge conversion: socialization, externalization, combination and internalization (SECI model).

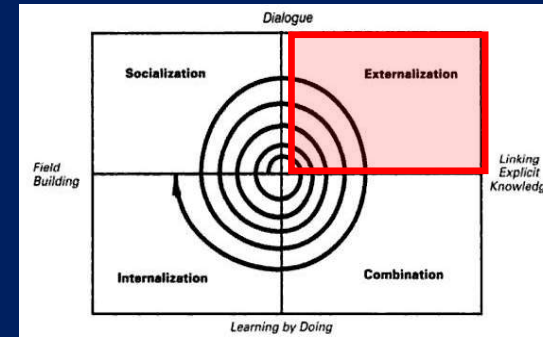


NUCLEONICA and KNOWLEDGE MANAGEMENT

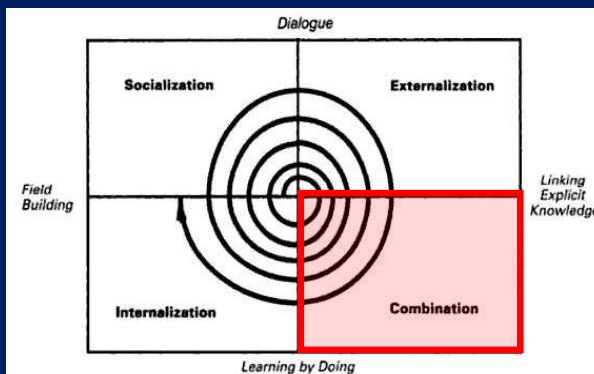
Socialisation (tacit \Rightarrow tacit)



Externalization (tacit \Rightarrow explicit)



Combination (explicit \Rightarrow explicit)



Internalization (explicit \Rightarrow tacit)



Nucleonica Education & Training



Education and Training ...

October 2010 Monaco

NuTroNS-1: Joint EC-IAEA Nuclear Science Training Course with NUCLEONICA, Monaco, 12-15th Oct. 2010.

The NuTroNS-1, 1st Joint EC-IAEA Nuclear Science Training Course with NUCLEONICA took place at the International Hydrographic Bureau in affiliation with the IAEA in Monaco, from the 12-15th October 2010. This was the first course devoted specifically to the use of Nucleonica within the field of Environmental Radioactivity. The course is aimed at persons who provide technical support (measurements, interpreting results, drawing conclusions, making recommendations) for the actions in response to environmental radioactivity issues. The participants included physicists, radio-chemists, health physicists, technical experts from national law enforcement agencies and regulatory authorities who may be involved in the assessment

Guest speakers included Drs M. Eriksson, Dr. Lasche from Sandia National Labs., Dr. Mayis University, Samsun, Ms. V. Klein, included Drs. J. Magill, Z. Soti.

In total, 22 participants from Azerbaijan, Romania, Russia, Turkey took part in the JRC's Enlargement and Integration Activities Potential Candidate Countries, and ENP

[NuTroNS-1 Photo Gallery,](#)

[More photos...](#)

[Training Course flyer, New Nucleonica B](#)

[Agenda Oct. 2010](#)

[Meet the Nucleonica Trainers...](#)



Links to the presentations and exercises:

[Nucleonica Overview \(J. Magill\)](#)

[Nucleonica Data Centre \(J. Magill\)](#)

■ [Hands on Exercises: Mass Activity Calculator, Dosimetry & Shielding, Nucleonica Data Centre \(Z. Soti\)](#)

[Range and Stopping Power \(M. Tufan\)](#)

[Using Nuclide Mixtures in Nucleonica \(R. Dreher\)](#)

[Decay Engine \(J. Magill\)](#)

[article](#)

[discussion](#)

[edit](#)

[history](#)

Previous training courses

Contents [hide]

1 Previous Training Courses

- 1.1 May 2011 Karlsruhe
- 1.2 January 2011 Karlsruhe
- 1.3 October 2010 Monaco
- 1.4 November 2009 Karlsruhe
- 1.5 April 2009 Karlsruhe
- 1.6 October 2008 Izmir
- 1.7 October 2008 Karlsruhe
- 1.8 October 2007 Karlsruhe
- 1.9 September 2006 Ljubljana
- 1.10 April 2006 Karlsruhe
- 1.11 September 2005 Ljubljana
- 1.12 April 2005 Karlsruhe
- 1.13 October 2004 Karlsruhe
- 1.14 April 2004 Karlsruhe
- 1.15 October 2003 Karlsruhe
- 1.16 September 2003 Karlsruhe



Karlsruhe Nuclide Chart ...



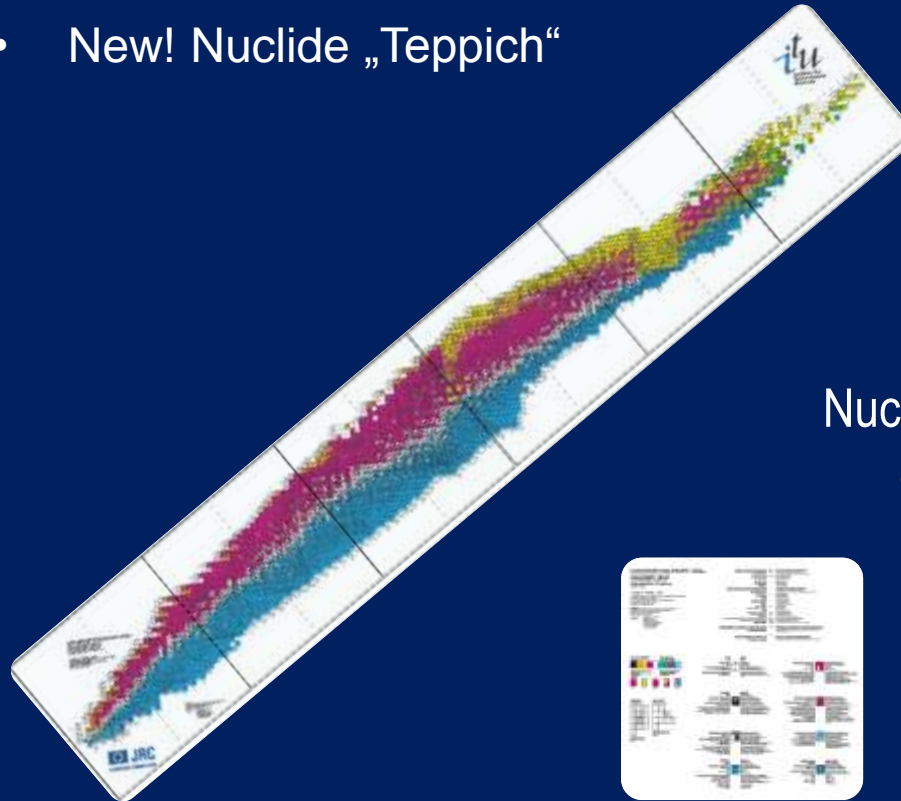
<http://www.KarlsruheNuclideChart.net>

Karlsruher Nuklidkarte ...

- New! 2009 Druck der Broschüre + Faltkarte
- New! 2010 Druck der Wandkarte
- New! Nuclide „Teppich“



2008




Nuclide „carpet“
8m!



Networking with Nucleonica

Networking with Nucleonica...



... web driven nuclear science

ApplicationsDataKnowledgeMy PreferencesPrintHelpNew Browser

» Nucleonica Networking

- » Networking
- » My Profile
- » My Community
- » My Mailbox
- » My Groups
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» Tools


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- » webGraph
- » Marketplace

» Applications Portal

- » nuclear science

» Coming soon


- » WESPA




» **Position on Gamma Spectrometry at ITU Karlsruhe** April 17, 2011

Position to develop an Web Spectrum Analyser (WESPA) for nuclear security.....


» **Nucleonica Blog**

 **Nucleonica Standalone for Bundesamt für Strahlenschutz**


The Federal Office for Radiation Protection in Germany (Bundesamt für Strahlenschutz – BfS) has recently ordered a standalone version of Nucleonica for use on notebook computers "in the field" where there may be no internet connection available. The standalone version is based on the use of a virtual server resident on the notebooks. After launching [...]

 **Nucleonica welcomes SCK-CEN users!**


Through an institutional license agreement, staff at the SCK-CEN in Belgium has now full Premium access to the Nucleonica modules and features. The Nucleonica team looks forward to a close interaction with the SCK-CEN colleagues and encourages a strong use of the web portal.

 **New JRC spin-off to work on the Nucleonica portal**

New JRC spin-off to work on the Nucleonica portal: As of March 2011, a new JRC spin-off company, Nucleonica GmbH, has been created. This company was established by a former staff member to undertake the further development of the Nucleonica portal – a nuclear science web portal developed at the JRC's Institute for Transuranium Elements [...]

 **GSG output now available in IAEA.spe format**

The Gamma Spectrum Generator (GSG) and GSG-Pro spectra can now be downloaded directly in IAEA .spe format with energy calibration. Previously, the GSG .txt output files had to be converted with the Cambio file translation module. Now the .spe files can be used directly in Cambio and web spectrum analyser WESPA or for other instruments.

 **Nucleonica welcomes ARPANSA users!**



Through an institutional license agreement, staff at the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) has now full Premium access to the Nucleonica modules and features. The Nucleonica team looks forward to a close interaction with the ARPANSA colleagues and encourages a strong use of the web portal.

Welcome, Joseph





My Settings

My ProfileMy Community


» My Community Events

-  You have 0 new messages
-  You have 0 new contact list requests


» Recent Nucleonica Members

	Mohamadreza K. Bakht		gming ZHOU
	Luigi Bruzzi		Paul OORTMAN GERLINGS


» **Nucleonica Forum**

 **ITRAC-3 Karlsruhe: Please give your feedback here!**

Dear ITRAC-3 participants! We would like you to give your opinions and remarks on the training course in this thread.

 **Calculating energy loss of 2 MeV electrons thru different materials**

I have a 2 MeV electron accelerator that is used for pulse radiolysis experiments. I am trying to figure out the effects of changing a beam window...

 **Radioactive decay calculations and spontaneous fission**

Networking with Nucleonica...

ITRAC-3

Leave Group

E-Mail Group

All Groups

File Upload Area

Founder: Joseph Magill

Category: Events

































Description: ITRAC-3: 3rd International Training Course on Illicit Trafficking and Radiological Consequences with Nucleonica, Karlsruhe, 11-13 May 2011.



























Infos:

Number of Users: 29

User List:

Keyword(s):

Image	Name	Surname	Organization	
	Khaled	Zakaria	Radiation Safety Department- National Center for Nuclear Safety and Radiation Control , Atomic Energy Authority – Cairo – Egypt	  
	Cigdem	Acar	Ege University, Institute of Nuclear Sciences	  
	Jalal	Aghayev		  
	Andrei	Apostol	Technical Support Organization "Inoteh"	  
	Andrey	Berlizov	International Atomic Energy Agency	  
	Maruta	Bunka	Paul Scherrer Institut	  
	Snezana	Dimovska	Institute of Public Health	  
	Raymond	Dreher	Nucleonica GmbH	  
	Jean	Galy	Institute for Transuranium	  

	Bernadette	Hammer	Paul Scherrer Institute	  
	Indra	Krevica	JRC-ITU	  
	Ceren	Kutahyalı	Ege University	  
	Sabrina	Lüthi	Paul Scherrer Institut	  
	Tobias	Lorenz	Paul Scherrer Institut	  
	Joseph	Magill	Nucleonica GmbH	  
	Lidija	Nikolovska	Institute of Public Health	  
	Emine	Nostar	Institute of Nuclear Sciences, Ege University	  
	Matthias	Rizzi	Paul Scherrer Institute	  
	Zsolt	Soti	European Commission	  
	Melsa	Stefanova	Faculty of Medical Science- University 'Goce Delcev', Stip, Macedonia	  
	Tanja	Stowasser	Paul Scherrer Institute Switzerland	  
	Monika	Sturm	EC-JRC-IRMM	  
	Magdalena	Toma	JRC-ITU-KARLSRUHE	  
	Velko	Velez	Institut of Public Health	  

Nucleonica Case Study: Fukushima



Fukushima Case Study with Nucleonica:

Create / Identify a Gamma Spectrum for Released nuclides

1. Reactor simulation to obtain the radionuclide inventory
2. Identify the strongest gamma emitting nuclides
3. Create a nuclide mixture
4. Generate the gamma spectrum
5. Identify the peaks




Fukushima Case Study with Nucleonica:

1. Reactor simulation
to obtain the
radionuclide inventory

nucleonica ... web driven nuclear science

Applications Data Knowledge My Preferences Print Help New Browser

 **webKORIGEN**

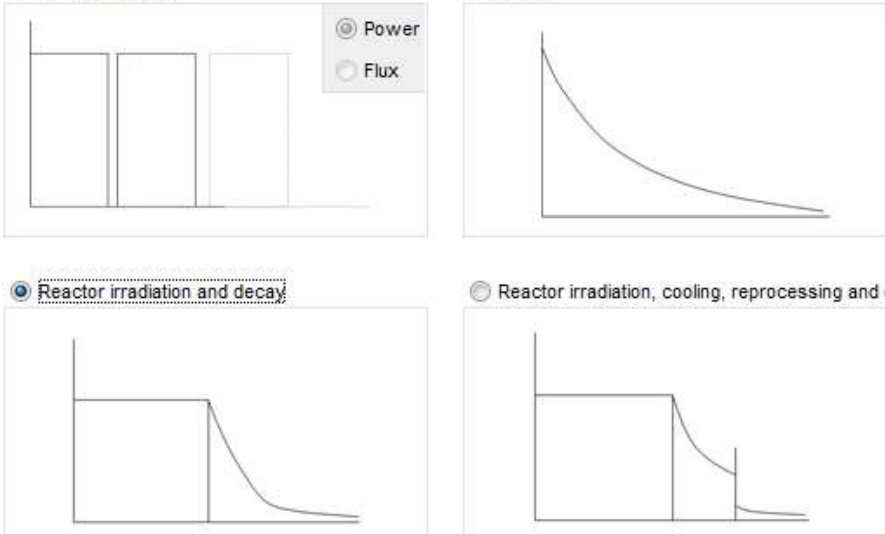
webKORIGEN was developed from the Oak Ridge Isotope Generation and Depletion code ORIGEN. Starting with a given initial reactor fuel or a single target nuclide, it calculates the time evolution of nuclide densities changing due to decays and neutron-induced reactions, and determines derived nuclear properties such as masses, radioactivities, heat releases, radiotoxicities, emission of radiation, etc...

Step 1: Calculation Mode Step 2: Reactor / Operation Step 3: Input Summary and Run Step 4: Display Results Step 5: Log files Step 6: Parameters

☐ Reactor irradiation ☒ Decay


☒ Reactor irradiation and decay ☐ Reactor irradiation, cooling, reprocessing and decay of waste

Power Flux




Fukushima Case Study with Nucleonica:

2. Identify the strongest gamma emitting nuclides

 ... web driven nuclear science

Applications Data Knowledge My Preferences Print Help New Browser

**webKORIGEN**

webKORIGEN was developed from the Oak Ridge Isotope Generation and Depletion code ORIGEN. Starting with a given initial reactor fuel or a single target nuclide, it calculates the time evolution of nuclide densities changing due to decays and neutron-induced reactions, and determines derived nuclear properties such as masses, radioactivities, heat releases, radiotoxicities, emission of radiation, etc...

Questions, remarks,

Step 1: Calculation Mode Step 2: Reactor / Operation Step 3: Input Summary and Run Step 4: Display Results Step 5: Log files Step 6: Parameters

Display results for nuclides/elements dominant at 7 d decay


Nuclides/Elements Radiations Nuclide Chart

Display quantity: Gamma Heat (W) Filter:


Plot	Z	Nuclides	Results	Plot	Z	Elements	Results	Plots	Totals	Nuclides	Elements	Results
<input type="checkbox"/>	57	La140	4.245e+5	<input type="checkbox"/>	57	Lanthanum	4.245e+5	<input type="checkbox"/>	Actinides+Progenies:	96	19	5.395e+4
<input type="checkbox"/>	41	Nb95	1.714e+5	<input type="checkbox"/>	41	Niobium	1.719e+5	<input type="checkbox"/>	Actinides:	64	11	5.395e+4
<input type="checkbox"/>	40	Zr95	1.577e+5	<input type="checkbox"/>	40	Zirconium	1.577e+5	<input type="checkbox"/>	Transuraniums:	39	7	4.908e+4
<input type="checkbox"/>	53	I132	9.453e+4	<input type="checkbox"/>	53	Iodine	1.165e+5	<input type="checkbox"/>	Minor Actinides:	21	3	4.908e+4
<input type="checkbox"/>	44	Ru103	7.782e+4	<input type="checkbox"/>	44	Ruthenium	7.782e+4	<input type="checkbox"/>	Radon:	3	1	1.558e-7
<input type="checkbox"/>	93	Np239	4.808e+4	<input type="checkbox"/>	93	Neptunium	4.907e+4	<input type="checkbox"/>	Fission Products:	337	39	1.160e+6
<input type="checkbox"/>	56	Ba140	2.602e+4	<input type="checkbox"/>	56	Barium	3.842e+4	<input type="checkbox"/>	Lanthanides:	63	11	5.025e+5
<input type="checkbox"/>	59	Pr144	2.339e+4	<input type="checkbox"/>	55	Cesium	2.951e+4	<input type="checkbox"/>	Rare Earths:	84	13	5.310e+5
<input type="checkbox"/>	55	Cs134	2.146e+4	<input type="checkbox"/>	59	Praseodymium	2.543e+4	<input type="checkbox"/>	Noble Metals:	40	4	9.740e+4
<input type="checkbox"/>	53	I131	2.129e+4	<input type="checkbox"/>	58	Cerium	2.082e+4	<input type="checkbox"/>	Inert Gases (Ne, Ar, Kr, Xe):	20	2	6.173e+3
<input type="checkbox"/>	45	Rh106	1.875e+4	<input type="checkbox"/>	45	Rhodium	1.927e+4	<input type="checkbox"/>	Hydrogen:	1	1	3.210e-4
<input type="checkbox"/>	58	Ce141	1.539e+4	<input type="checkbox"/>	61	Promethium	1.337e+4	<input type="checkbox"/>	Helium:	0	0	0.000e+0
<input type="checkbox"/>	55	Ba137m	1.498e+4	<input type="checkbox"/>	55	Tellurium	1.498e+4					

Fukushima Case Study with Nucleonica:

3. Create a nuclide mixture

... web driven nuclear science

ApplicationsDataKnowledgeMy PreferencesPrintHelpNew Browser



Nuclide Mixtures

[Getting started](#)[Reference manual](#)












My MixturesEditUploadSample Mixtures

Name

Fukushima

Description:

webKorigen calculation

Nuclide 	Activity(Bq)	Mass(g)	Number of Atoms	Mass ratio	Mole ratio	Activity ratio	Delete
<i>(add a new Nuclide)</i>							
40 Zr 95	1.340e+18	1.686e+3	1.070e+25	0.4596	0.5452	0.3536	
41 Nb 95	9.900e+15	6.805	4.318e+22	1.856e-3	2.201e-3	2.612e-3	
52 Te 132	3.000e+17	26.24	1.198e+23	7.157e-3	6.107e-3	0.07916	
53 I 131	3.800e+17	82.61	3.800e+23	0.02253	0.01937	0.1003	
53 I 132	3.200e+17	0.8355	3.814e+21	2.278e-4	1.944e-4	0.08443	
55 Cs 134	8.600e+16	1.798e+3	8.086e+24	0.4903	0.4122	0.02269	
55 Cs 136	2.400e+16	8.797	3.898e+22	2.399e-3	1.987e-3	6.333e-3	
56 Ba 137 m	1.300e+17	6.529e-3	2.872e+19	1.780e-6	1.464e-6	0.03430	
57 La 140	1.200e+18	58.33	2.511e+23	0.01591	0.01280	0.3166	
Total: 9	3.790e+18	3.667e+3	1.962e+25	1.000	1	1	

Fukushima Case Study with Nucleonica:

4. Generate the gamma spectrum

nucleonica ... web driven nuclear science

Applications Data Knowledge My Preferences Print Help New Browser

Gamma Spectrum Generator
Fukushima

Actual chart: Karlsruhe

Nuclide Mixtures:
Fukushima [Nuclide Selector](#)

Total activity:
Bequerel

Reference point:
Measurement start

Measurement setup Calculation results Options

Measurement time: sec

Current configuration:

Dimensions in

Source

Filter

Nal Crystal

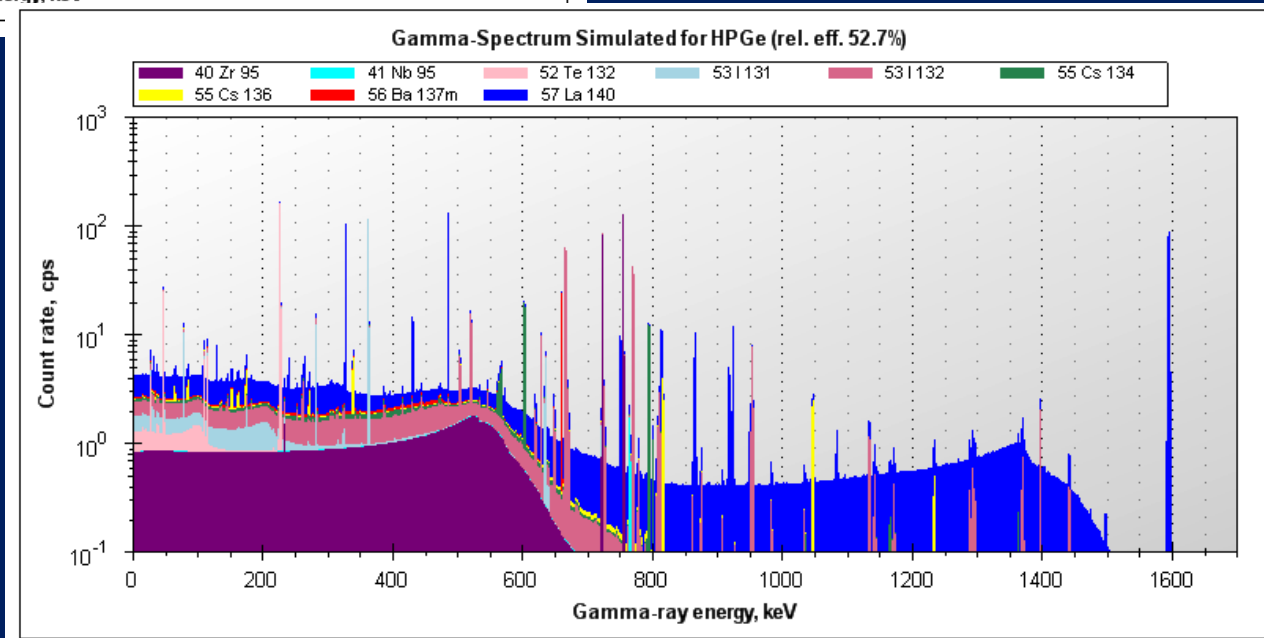
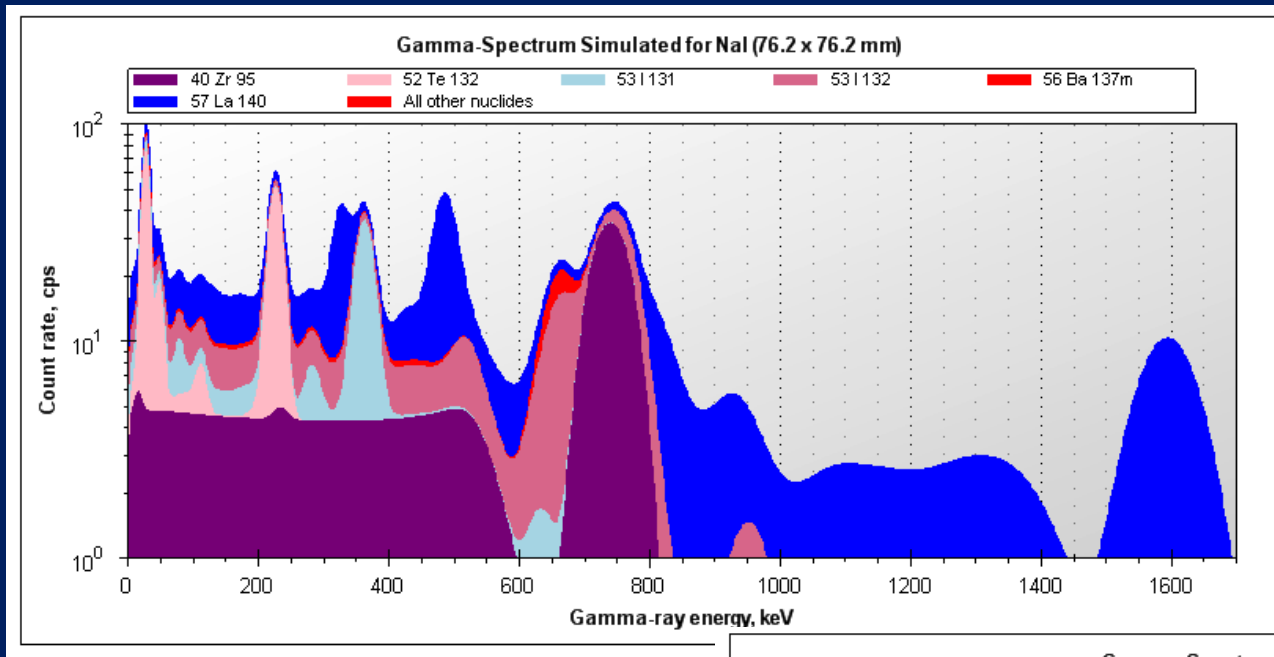
Crystal diameter: 76.2

Source to Detector distance: 250.0

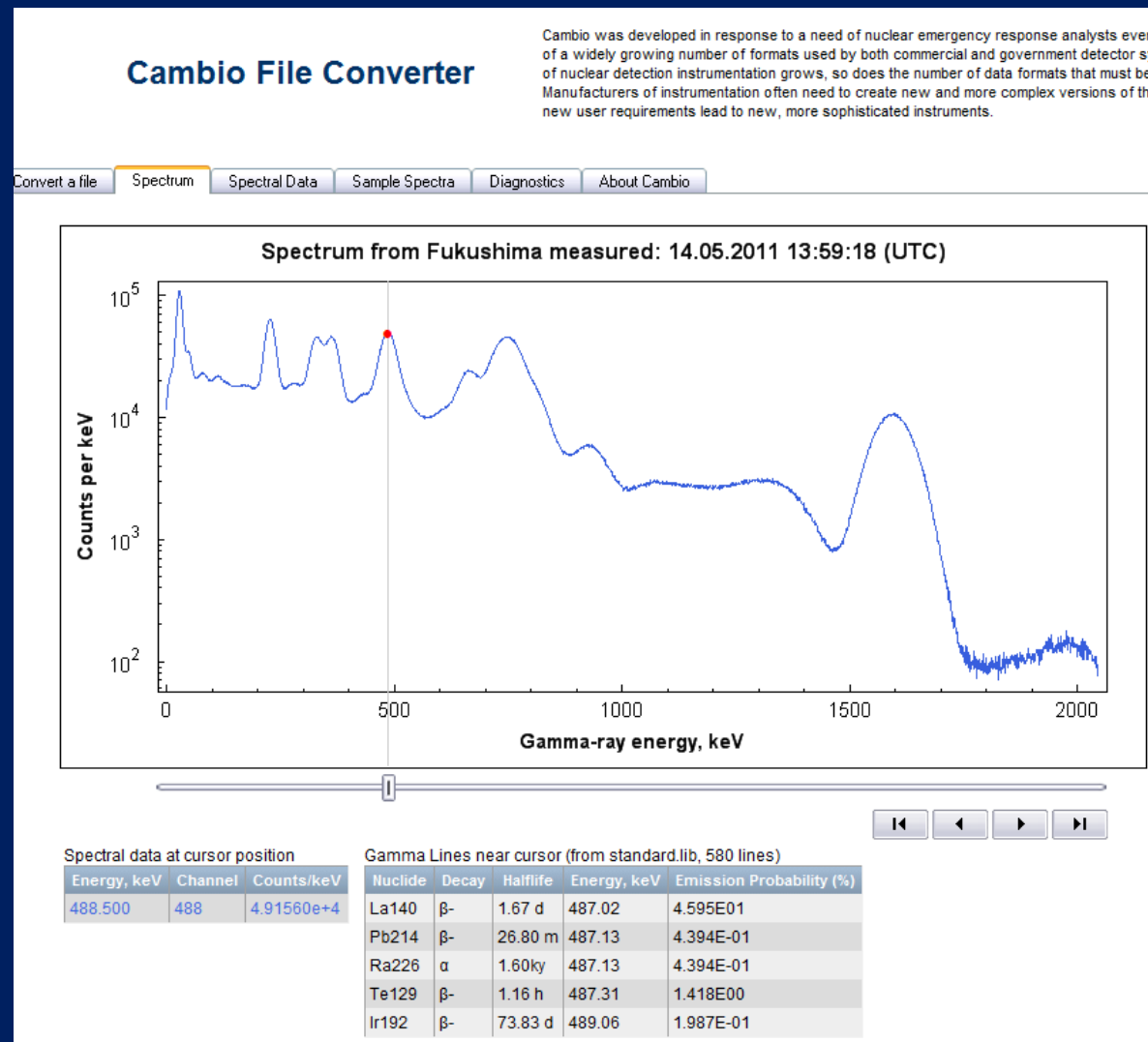
Crystal length: 76.2

☐ Show more settings

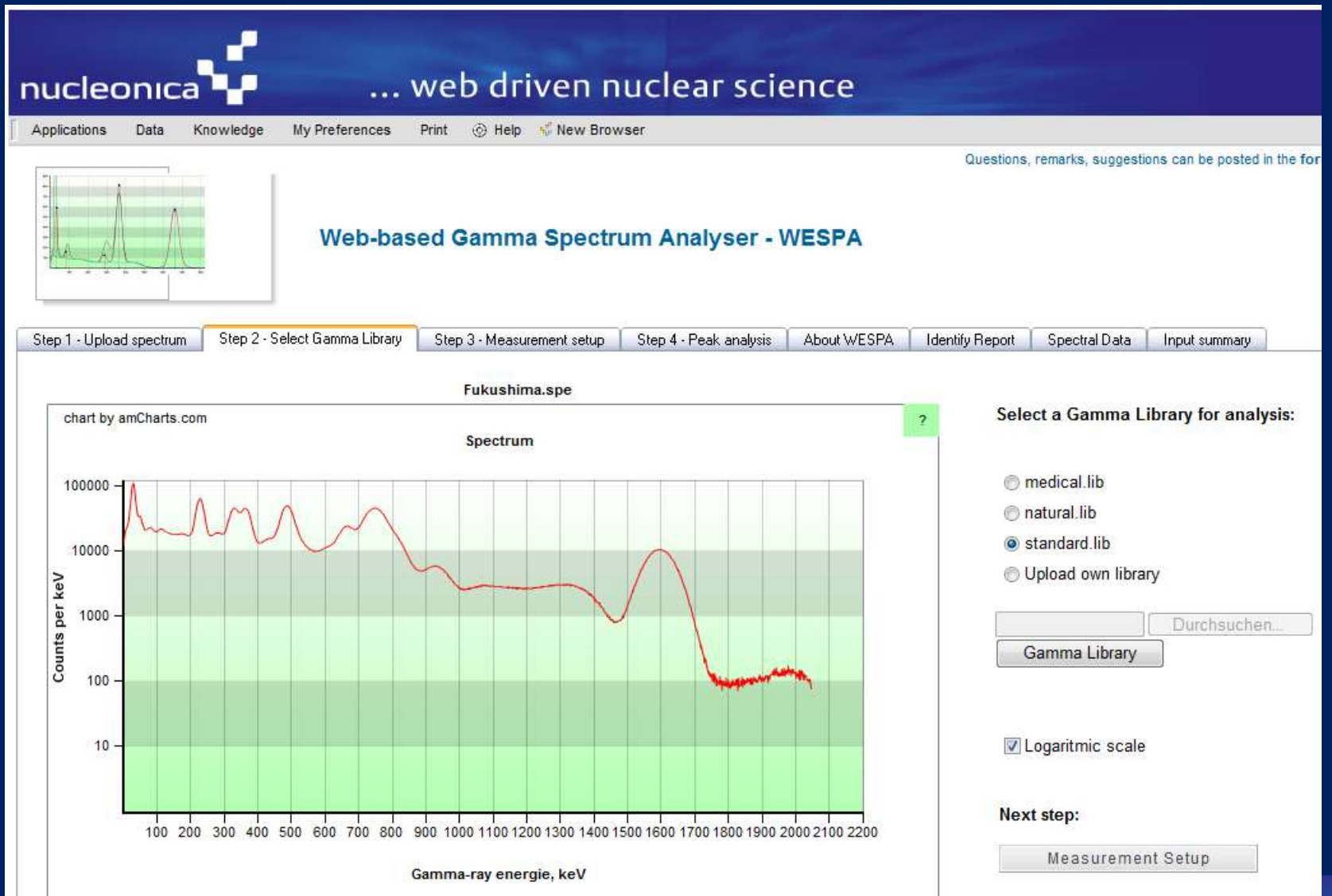
Fukushima Case Study with Nucleonica:



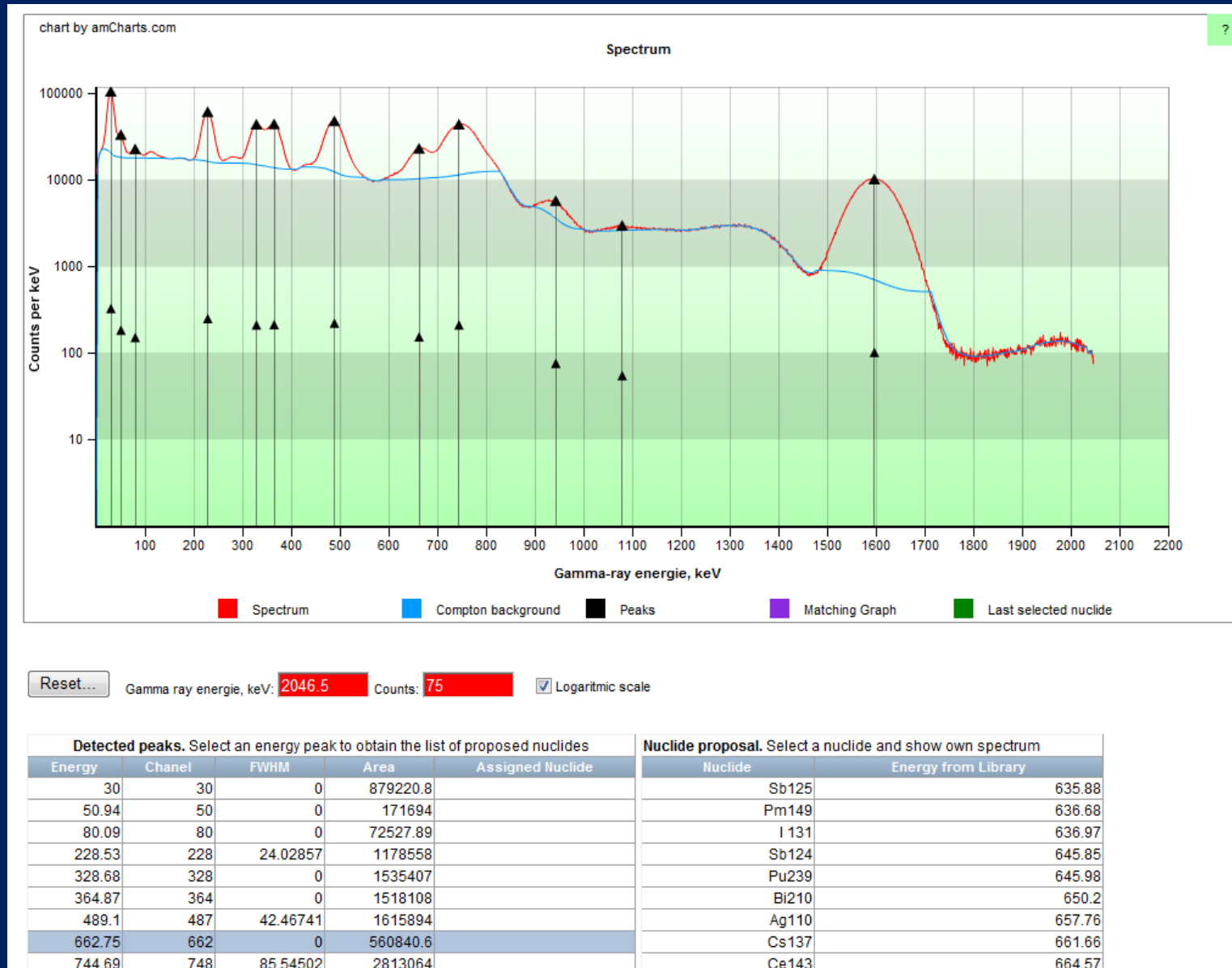
Fukushima Case Study with Nucleonica:



Fukushima Case Study with Nucleonica:

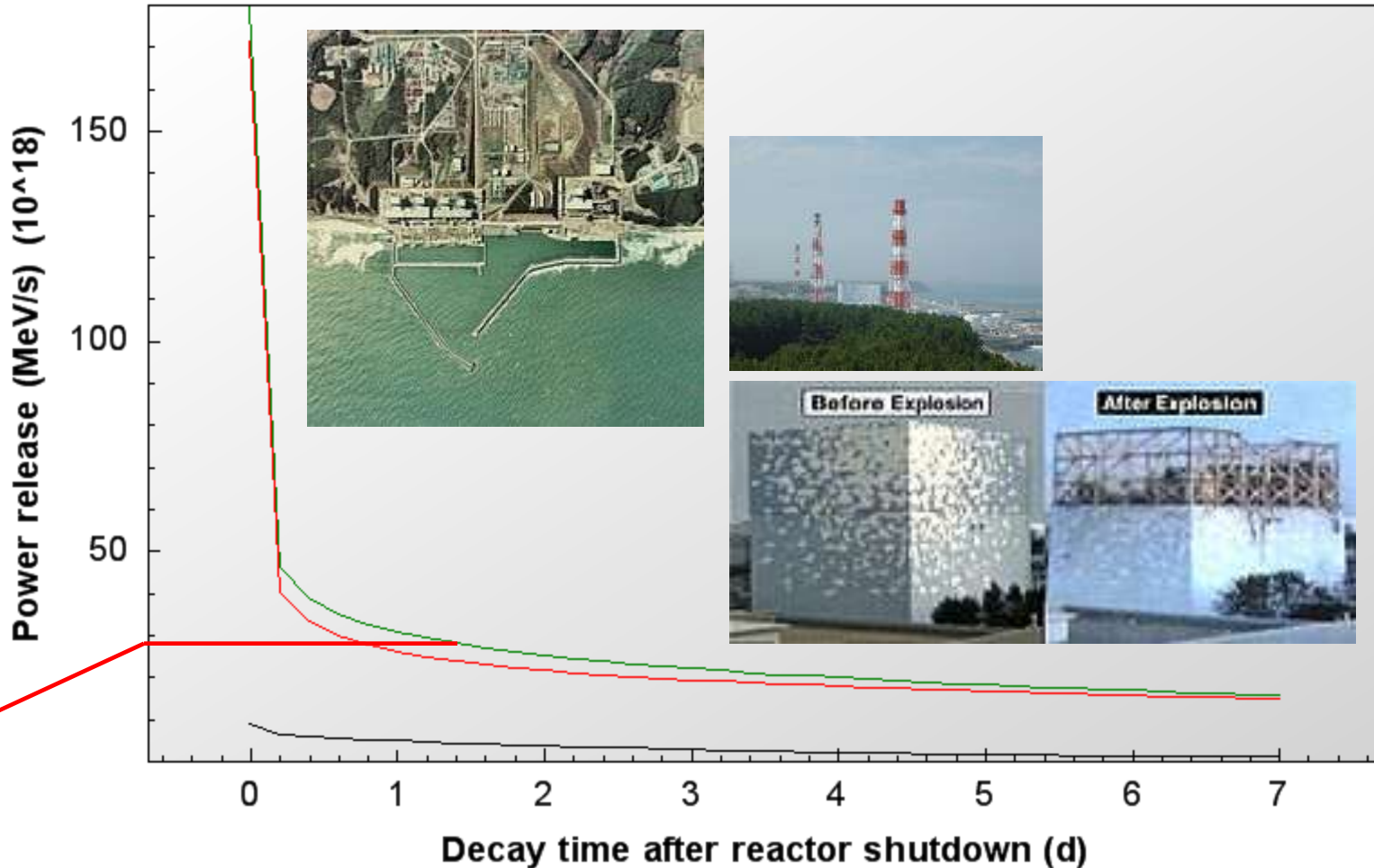
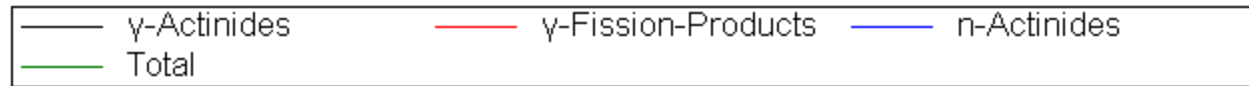


Fukushima Case Study with Nucleonica:



Fukushima I Nuclear Power Plant, 460 MW

Power release during 7 d decay of 60 tHM BWR UOX 40 MWd/kg



Implementing of Education and Training: Nuclear Knowledge & Data Dissemination with Nucleonica

What is Nucleonica?

The Nucleonica Portal

Nucleonica & Nuclear Knowledge Management

Education & Training

Networking

Case Study: Fukushima



Thanks!



NUCLEONICA Application Development (Socialisation)

The first step in the development of a Nucleonica application involves the Nucleonica team working together with an expert to develop an application module. This step can be directly compared with the "socialization" step in the SECI knowledge spiral model in which the "tutor" is the expert and the "apprentices" are the Nucleonica developers. The main issue here is developing a close relationship with the expert or "tutor" to try to crystallise his knowledge and know-how and to concentrate on the essential features of the program. A further goal in this first step is the creation of a "knowledge object" i.e. a full working version of the web-based scientific application.

NUCLEONICA Wiki (Combination)

Within the SECI model, the "Combination" process makes extensive use of a wiki systemizing explicit knowledge. The primary use of this wiki is to provide all the technical documentation or articles required to support the various Nucleonica applications. The basic characteristic of a wiki is that it allows the article author to directly edit and add content online (the word "wiki" means fast in Hawaiian) - there is no need for a web master or programmer to convert the text into html. In addition to providing an online Help for the applications, the Nucleonica wiki is also used to provide additional EKO's such as a Glossary of Nuclear Science, Ask an Expert and Frequently Asked questions (FAQs). These features allow Nucleonica to grow organically and provide a powerful nuclear science information source for its users.

NUCLEONICA Forum (Externalisation). The main goal of the Nucleonica forum is to capture the tacit knowledge of experts and peers alike within the specific context of the Nucleonica applications. Initially the user will have little knowledge of the application. However, after some experimentation, the user can post questions in the Nucleonica forum dedicated to this particular application. The approach is based on a question and answer interaction between the expert (and the Nucleonica developers) who possesses tacit knowledge and users. The knowledge or know-how flow is "externalized" by the fact that the question and answer dialogue is fully recorded in the forum database.

Initially, the interaction primarily takes place in a dialogue between the expert(s) and the users. Once a certain amount of interaction has taken place, the users start interacting with each other until the point where the tacit knowledge of the expert has been made explicit in the forum database. At this point, the tacit knowledge has been transformed into explicit knowledge.

NUCLEONICA Application (Internalisation)

The final step in the SECI knowledge spiral is the internalization. Internalization is the conversion from explicit to tacit, which is triggered through "Learning by Doing". This is the process by which tacit knowledge that has been made explicit through externalization and combination, is then integrated back into the tacit knowledge base of other members of the organisation. Thus, at the end of the spiral process, when knowledge has been socialized, combined, externalized and internalized, one or more individuals in the organisation have acquired new tacit knowledge. The Learning by Doing concept refers to the ability of workers to improve their skills by regularly repeating the same types of action. The Nucleonica applications are a direct manifestation of this concept. No expert knowledge is required to use the applications. At the simplest level, the user can "play" with the user friendly scientific applications with one or two mouse clicks. Technical Help is given in the wiki. As the user becomes more confident and gains increasing experience, he can attempt more sophisticated calculations.

The NUCLEONICA Portal:

Nucleonica Contents

What is Nucleonica?

Nuclear Data

Nuclide Explorer

DataSheets

Nuclear Data Retrieval

Fission Yields

Universal Nuclide Chart

Karlsruhe Nuclide Chart

Tools

webGraph

Scientific Calculator and Conference Calendar

Nuclide Mixtures

Gamma Library Creation

Nucleonica Scripting

Applications

10. Mass Activity Calculator

11. Decay Engine

12. Decay Engine for Large Nuclide Sets

13. Gamma Dosimetry & Shielding

14. Range & Stopping Power

15. webKORIGEN

16. Neutron Activation with webKORIGEN

17. Gamma Spectrum Generator

18. Cambio File Converter

19. WESPA web spectrum analyser

20. In Silico Dosimetry

Networking

Register as a Nucleonica User

Wiki, Blog, Forum and Nuclear News

Nuclear Science Training Courses

The NUCLEONICA Portal:

NUCLEONICA as a platform for scientific applications development

- Currently NUCLEONICA consists of individual modules
 - Modules can be “combined” for batch processing through the NUCLEONICA scripting language
 - Open up NUCLEONICA to external developers
- checklist of tools required:
- access to the NUCLEONICA databases
 - a testing environment where the developer and the NUCLEONICA team can test new application
 - an upload facility whereby the developer can upload the application to the NUCLEONICA platform

Recent Example: development of an *In silico* dosimetry module



The NUCLEONICA Portal:

Conclusions: Key Advantages of Nucleonica

- Keep informed with the latest news on nuclear issues
- Use internationally evaluated nuclear data in your work
- Extensive range of nuclear science applications
- Manage all your data in a single browser-based system and keep track of your recent activities
- Prepare a lecture or a training course with Nucleonica materials (graphics. etc.)
- Prepare publication quality scientific graphs
- Stay in contact with your colleagues from previous employment, workshops or conferences
- Meet scientists from your areas of interest and build up an international contact list and represent yourself and your Institute/Organisation in the international science community



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